

# Jared F. Miller

CONVEX OPTIMIZATION · NONLINEAR SYSTEMS · CONTROL

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## Education

### Northeastern University

Boston, MA, USA

#### PH.D. IN ELECTRICAL AND COMPUTER ENGINEERING

Sept. 2018 - Present

- Communications, Control, and Signal Processing (CCSP)
- Advised by Prof. Mario Sznaiier
- Thesis Committee: Mario Sznaiier, Octavia Camps, Bahram Shafai, Eduardo Sontag, Didier Henrion (LAAS-CNRS)
- GPA: 4.0 (4.0 Scale)
- Expected Graduation May 2023

#### M.S. IN ELECTRICAL AND COMPUTER ENGINEERING

Sept. 2015 - May 2018

- Communications, Control, and Signal Processing (CCSP)
- GPA: 3.852 (4.0 Scale)

#### B.S. IN ELECTRICAL ENGINEERING

Sept. 2013 - May 2018

- Minor in Mathematics
- GPA: 3.865 (4.0 Scale)

## Research Publications

### Journal Papers (published)

1. Jared Miller, Yang Zheng, Mario Sznaiier, and Antonis Papachristodoulou. Decomposed structured subsets for semidefinite and sum-of-squares optimization. *Automatica*, 137:110–125, 2022. [link]
2. J. Miller, D. Henrion, and M. Sznaiier. Peak Estimation Recovery and Safety Analysis. *IEEE Control Systems Letters*, 5(6):1982–1987, 2021. [link]
3. Jared Miller, Muhammad Ali Al-Radhawi, and Eduardo Daniel Sontag. Mediating Ribosomal Competition by Splitting Pools. *IEEE Control Systems Letters*, 5(5):1555–1560, 2021. [link]

### Journal Papers (conditionally accepted)

1. Jared Miller and Mario Sznaiier. Bounding the Distance to Unsafe Sets with Convex Optimization, 2021. [link] (IEEE Transactions on Automatic Control)

### Journal Papers (submitted)

1. Jared Miller and Mario Sznaiier. Data-Driven Gain Scheduling Control of Linear Parameter-Varying Systems using Quadratic Matrix Inequalities, 2022. [link]

### Conference Proceedings (published)

1. Jared Miller and Mario Sznaiier. Facial Input Decompositions for Robust Peak Estimation under Polyhedral Uncertainty. *IFAC-PapersOnLine*, 55(25):55–60, 2022. [link] (Young Author Award)
2. Jared Miller, Didier Henrion, Mario Sznaiier, and Milan Korda. Peak Estimation for Uncertain and Switched Systems. In *2021 60th IEEE Conference on Decision and Control (CDC)*, pages 3222–3228, 2021. [link] (Outstanding Student Paper Award)
3. J. Miller, R. Singh, and M. Sznaiier. MIMO System Identification by Randomized Active-Set Methods. In *2020 59th IEEE Conference on Decision and Control (CDC)*, pages 2246–2251, 2020. [link]
4. Jared Miller, Yang Zheng, Mario Sznaiier, and Antonis Papachristodoulou. Decomposed Structured Subsets for Semidefinite Optimization. In *2020 21st IFAC World Congress*, 2020. [link]
5. Chieh Wu, Jared Miller, Yale Chang, Mario Sznaiier, and Jennifer Dy. Solving Interpretable Kernel Dimensionality Reduction. In H. Wal-lach, H. Larochelle, A. Beygelzimer, F. d'Alché-Buc, E. Fox, and R. Garnett, editors, *Advances in Neural Information Processing Systems*, volume 32, pages 7915–7925. Curran Associates, Inc., 2019. [link] (acceptance rate 21.9%)
6. J. Miller, Y. Zheng, B. Roig-Solvas, M. Sznaiier, and A. Papachristodoulou. Chordal Decomposition in Rank Minimized Semidefinite Programs with Applications to Subspace Clustering. In *2019 IEEE 58th Conference on Decision and Control (CDC)*, pages 4916–4921, 2019. [link]
7. J. Miller and B. Shafai. A Model of Heave Dynamics for Bagged Air Cushioned Vehicles. In *2019 IEEE Conference on Control Technology and Applications (CCTA)*, pages 976–981, 2019. [link]
8. B. Taskazan, J. Miller, U. Inyang-Udoh, O. Camps, and M. Sznaiier. Domain Adaptation Based Fault Detection in Label Imbalanced Cyberphysical Systems. In *2019 IEEE Conference on Control Technology and Applications (CCTA)*, pages 142–147, 2019. [link]

## Conference Proceedings (accepted but not yet published)

1. Jared Miller and Mario Sznaier. Bounding the Distance of Closest Approach to Unsafe Sets with Occupation Measures. In *2022 61st IEEE Conference on Decision and Control (CDC)*, 2022 (61st IEEE Conference on Decision and Control [CDC] Dec. 6-9, 2022)
2. Jared Miller, Tianyu Dai, and Mario Sznaier. Data-Driven Superstabilizing Control of Error-in-Variables Discrete-Time Linear Systems, 2022 (61st IEEE Conference on Decision and Control [CDC] Dec. 6-9, 2022)
3. Filip Bećanović, Jared Miller, Vincent Bonnet, Kosta Jovanović, and Samer Mohammed. Assessing the Quality of a Set of Basis Functions for Inverse Optimal Control via Projection onto Global Minimizers, 2022 (61st IEEE Conference on Decision and Control [CDC] Dec. 6-9, 2022)

## Conference Proceedings (submitted)

1. Jared Miller and Mario Sznaier. Data-Driven Gain Scheduling Control of Linear Parameter-Varying Systems using Quadratic Matrix Inequalities, 2022. [link]
2. Jared Miller, Tianyu Dai, and Mario Sznaier. Superstabilizing Control of Discrete-Time ARX Models under Error in Variables, 2022. [link]
3. Alexander Epstein, Nimish Magre, and Jared Miller. Time-Frequency Regularized Overlapping Group Shrinkage, 2022

## Preprints

1. Jared Miller, Tianyu Dai, and Mario Sznaier. Data-driven stabilizing and robust control of discrete-time linear systems with error in variables, 2022. [link]
2. Jared Miller and Mario Sznaier. Facial input decompositions for robust peak and reachable set estimation under polyhedral uncertainty, 2021. [link]

## Seminars

1. Bounding the Distance to Unsafe Sets with Convex Optimization, DCSD Rising Stars, 2nd Modeling, Estimation and Control Conference, Jersey City, October 2-5 2022. [link]
2. Tutorials about Convexity, Interior Point Methods, Frank-Wolfe algorithms (with applications to system identification), and Polynomial Optimization, June 27, 2022, From Data to Control, Israeli Association of Automatic Control (with M. Sznaier). [link]
3. "Bounding distances to unsafe sets", June 16, 2022, IfA Coffee Talks, ETH Zurich. [link]
4. "Bounding distances to unsafe sets", June 14, 2022, LA3 Meeting, EPFL Lausanne. [link]
5. "Bounding distances to unsafe sets", June 3, 2022, Journées SMAI MODE, University of Limoges (XLIM). [link]
6. Tutorials about Interior Point Methods, Polynomial Optimization, Frank-Wolfe algorithms and variations, and SDP approximations, May 16-20, Sparsity and Big Data in Control, Systems Identification, and Machine Learning, European Embedded Control Institute.
7. "Bounding distances to unsafe sets", April 14, 2022, Conic Linear Optimization for Computer-Assisted Proofs, Mathematisches Forschungsinstitut Oberwolfach (MFO). [link]
8. "Bounding distances to unsafe sets", June 28, 2021, Brainstorming days on measure and polynomial optimization (BrainPOP), LAAS-CNRS. [link]
9. "Data-Driven Peak and Reachability Set Estimation", May 25, 2021, MS112 Methods of Learning Dynamical Systems for Control, SIAM Conference on Dynamical Systems. [link]
10. "Analysis and Control of Time-Delay Systems with Occupation Measures", May 3, 2021, BrainPOP, LAAS-CNRS. Work not yet published, in preparation. [link]
11. "Exploiting Structure in Rank-Constrained and Approximated Semidefinite Programs", December 19, 2019, TISEM Operations Research Seminar, Tilburg University. [link]

## Poster Sessions (without Conference Proceedings)

1. "Safety Analysis using Distance Estimation and Measures." August 24, 2022. CLEVR-AI MURI Yearly Review Meeting, Northeastern University. [link]
2. "Exploiting SDP Structure Yields Tighter Approximations." April 9, 2020. RISE, Northeastern University (remote). [link]
3. "Exploiting SDP Structure Yields Tighter Approximations." February 24, 2020. IPAM Control, Learning and Optimization workshop, University of California, Los Angeles. [link]
4. "Chordal Decompositions in Rank Minimized SDPs." May 30-31, 2019. Learning for Decision and Control (L4DC), Massachusetts Institute of Technology. [link]
5. "Chordal Decompositions in Rank Minimized SDPs." May 10, 2019. New England Machine Learning Day, Northeastern University. [link]
6. "Scattered data interpolation through B-spline wavelets and the Elastic Net." April 14, 2017. RISE, Northeastern University. [link]
7. "A parallelized Python-based Multi-Point Thomson Scattering analysis in NSTX-U." October 29, 2014. 56th Annual APS Plasma Physics Conference, New Orleans. [link]

# Experience

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## Northeastern University

RESEARCH ASSISTANT, ROBUST SYSTEMS LAB, CONTROLS GROUP

*Boston, MA, USA*

*Jul. 2017 - Present*

## Laboratory for Analysis and Architecture of Systems (LAAS-CNRS)

CHATEAUBRIAND FELLOW, DECISION AND OPTIMIZATION, METHODS AND ALGORITHMS IN CONTROL (MAC) TEAM

*Toulouse, FR*

*Jan. 2022 - Jul. 2022*

## Paradigm Hyperloop

CONTROL THEORIST, LEVITATION GROUP

*Boston, MA, USA*

*Jul. 2017 - Dec. 2017*

## ASML Holding

CO-OP, METROLOGY GROUP

*Veldhoven, NL*

*Mar. 2016 - Aug. 2016*

## Advanced Micro Devices (AMD)

CO-OP, SHADER COMPILER GROUP

*Boxborough, MA, USA*

*Jan. 2015 - Jun. 2015*

## Princeton Plasma Physics Laboratory (PPPL)

INTERN/PART-TIME CONTRACTOR, DATA VISUALIZATION GROUP

*Plainsboro Township, NJ, USA*

*Sep. 2012 - Feb. 2016*

## Cornell High Energy Synchrotron Source (CHESS)

SUMMER INTERN/RESEARCH ASSISTANT

*Ithaca, NY, USA*

*Jul. 2012 - Aug. 2012*

## Teaching

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### Northeastern University

TEACHING ASSISTANT

- EECE 5644: Machine Learning and Pattern Recognition

*Boston, MA, USA*

*Fall 2022*

TEACHING ASSISTANT

- EECE 7345: Big Data, Sparsity, and Control

*Fall 2021*

### European Embedded Control Institute

TEACHING ASSISTANT

- Sparsity and Big Data in Control, Systems Identification and Machine Learning

*Toulouse, FR*

*May 16-20, 2022*

## Honors & Awards

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Dec. 2022 **Travel Award**, 2022 61st IEEE Conference on Decision and Control

*Cancún, MX*

Oct. 2022 **ASME DSCD Rising Star Award**, MECC 2022 (IFAC)

*Jersey City, NJ, USA*

Sep. 2022 **Young Author Award**, ROCOND 2022 (IFAC)

*Kyoto, JP (remote)*

Apr. 2022 **Travel Award**, MFO: Conic Linear Optimization for Computer-Assisted Proofs

*Oberwolfach, DE*

Jan. 2022 **Travel Award (for Toulouse)**, AFOSR FY22 International Student Exchange Program (ISEP)

*Arvada, CO, USA*

Dec. 2021 **Outstanding Student Paper Award**, 2021 60th Conference on Decision and Control

*Austin, TX, USA*

Apr. 2020 **Chateaubriand Fellowship**, Office of Science and Technology, Embassy of France in the USA

*Toulouse, FR*

Feb. 2020 **Hosting**, IPAM: Intersections between Control, Learning and Optimization (UCLA Workshop)

*LA, CA, USA*

Dec. 2019 **Travel Award for Seminar**, TISEM Seminar at Tilburg University

*Tilburg, NL*

Aug. 2019 **Travel Award**, 2019 IEEE Conference on Control Technology and Applications (CCTA)

*Hong Kong*

2013-2018 **Honors Program**, Northeastern University

*Boston, MA, USA*

2015-2018 **Dean's List**, Northeastern University

*Boston, MA, USA*

## Skills

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**Programming** Matlab (incl. Simulink), Python, Mathematica, LaTeX, Julia, C/C++

**MS Office** Word, Excel, PowerPoint, Publisher

## Professional Organizations

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### Institute of Electrical and Electronics Engineers (IEEE)

(GRADUATE) STUDENT MEMBER

*Sept. 2013 - Present*

## **IEEE Eta Kappa Nu (HKN)**

MEMBER

*Sept. 2014 - Present*

## **Society for Industrial and Applied Mathematics**

MEMBER

*Oct. 2019 - Present*

## **IEEE CSS Technical Committee on Robust and Complex Systems (TC-RoCS)**

MEMBER

*Sept. 2022 - Present*

## **IFAC Technical Committee 2.5 Robust Control**

MEMBER

*Sept. 2022 - Present*

## **Professional Service**

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### **Reviewer**

Automatica, IEEE TAC, IEEE L-CSS, L4DC, ROCOND, CDC, Nonlinear Analysis: Hybrid Systems, Kybernetika